LG HiMEC VACUUM CIRCUIT BREAKERS

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LG Industrial Systems

LG HiMEC
VACUUM CIRCUIT BREAKER

ISO9001, ISO1

LG HiMEC
Vacuum Circuit Breaker

HiMEC Series

HiMEC
VACUUM
CIRCUT
BREAKER

Features

HiMEC Series has the following features.

High Performance and Reliability
High reliability, using 2links and trip-free switching mechanism

Excellent Interrupting Capacity
Having a surgeless type V.I(Vacuum Interrupter), low chopping current occurs when opening the contact.(Under 3~4A)

Increased Safety(Various Interlock functions)
- Prevention of closing when inserting and drawing-out
- Prevention of inserting and drawing-out when the breaker is closed
- Prevention of re-closing when the breaker is closed
- Prevention of earth s/w operation when inserting and drawing-out
- Prevention of inserting and drawing-out when the earth s/w is in operation

Compact Size

Easy Maintenance
The bushing is placed on the front side of metal clad switch gear for easy maintenance

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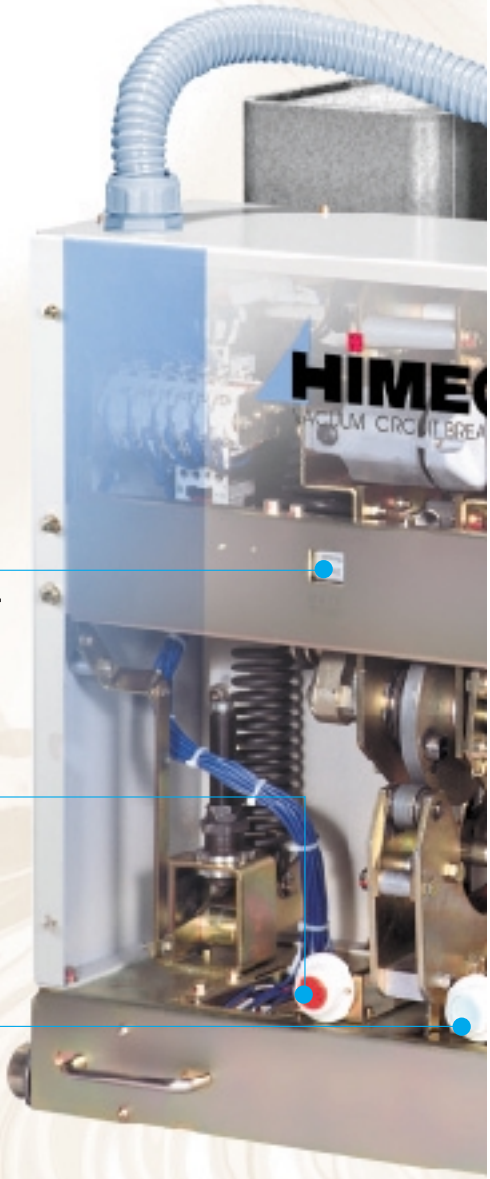
Construction

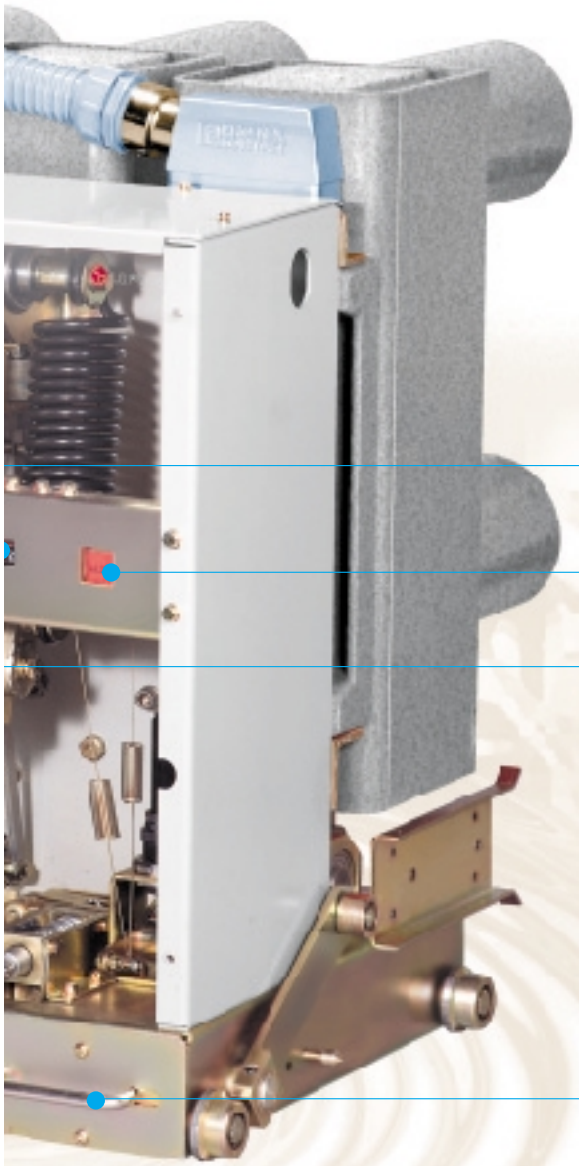


Internal Structure

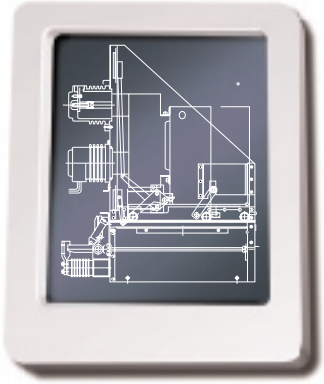
Side View

Rear View

Cradle



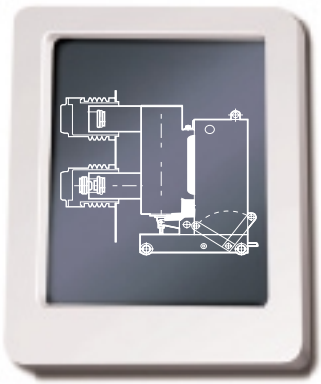
Side View of Cradle



Fixed Type (P1 Type)

Fixed Type (P2 Type)

Draw-Out Type (M Type)



Specifications

Rating \ Type	GVB- □/ □-250/06MF-G	GVB- □/ □-300/06MF-G	GVB- □/ □-350/06MF-G	GVB- □/ □-500/06MF-G	GVB- □/ □-400/12MF-G	GVB- □/ □-500/12MF-G	GVB- □/ □-650/12MF-G	GVB- □/ □-800/12MF-G
Rated Voltage (kV)	7.2				12			
Rated Current (A)	630 1250 2000		1250 2000 3150		630 1250 2000		1250 2000 3150	
Rated Frequency (Hz)	50 / 60							
Rated Interrupting Current (kA)	20	25	31.5	40	20	25	31.5	40
Rated Making Current (kA)	50	62.5	78.7	100	50	62.5	78.7	100
Rated Short Time Current (kA/3sec)	20	25	31.5	60	20	25	31.5	40
Rated Opening Time (sec)	0.04				0.04			
Closing Time at No Load (sec)	0.1				0.1			
Interrupting Time (Cycle)	3				3			
Insulation Level — Frequency(kV/1min)	20				28			
Insulation Level — Impulse(kV/1.2 ×50 μs)	60				75			
Closing and Tripping Current	5A at 110V DC / 11A at 48V DC							
Closing and Tripping Voltage	DC110, 125, 220, 48V							
Life Expectancy (Operation) — Electrical	10,000							
Life Expectancy (Operation) — Mechanical	20,000							
Operating Duty	CO-15sec-CO O-0.3sec-CO-3min-CO CO-0.3min-CO-3min-CO							
Auxiliary s/w	4NO+4NC(Standard),10NO+10NC(Max.)							
Weight (Kg, Fixed Type)	630A:130 1250A:130 2000A:150		1250A:130 2000A:150 3150A:190	1250A:170 2000A:180 3150A:190	630A:130 1250A:130 2000A:140		1250A:130 2000A:140 3150A:190	1250A:170 2000A:180 3150A:190
Installation Type	P, M, G							
Standard	IEC56							

NOTE : **1.** P : Fixed Type
M : Draw-out Type without cradle
G : Draw-out Type with Non-shutter & Bushing cradle
* For 5, 24, 25.8kV contact the manufacturer.

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Vacuum Interrupter

GVB- □/ □-500/15MF-G	GVB- □/ □-750/15MF-G
15	
1200 2000	
18	28
45	70
18	28
0.04	
0.1	
3	
36	
95	
1200A:170 2000A:180	

Structure

The internal components of a typical vacumm Interrupter are shown in Fig 1.
LG Vacuum Interrupter consists of a ceramic insulator, two end plates, arc shield, bellows, a movable and fixed electrode, and contacts set, ect.
The ambient gas pressure within the evacuated tube is approximately 10^{-6}torr.

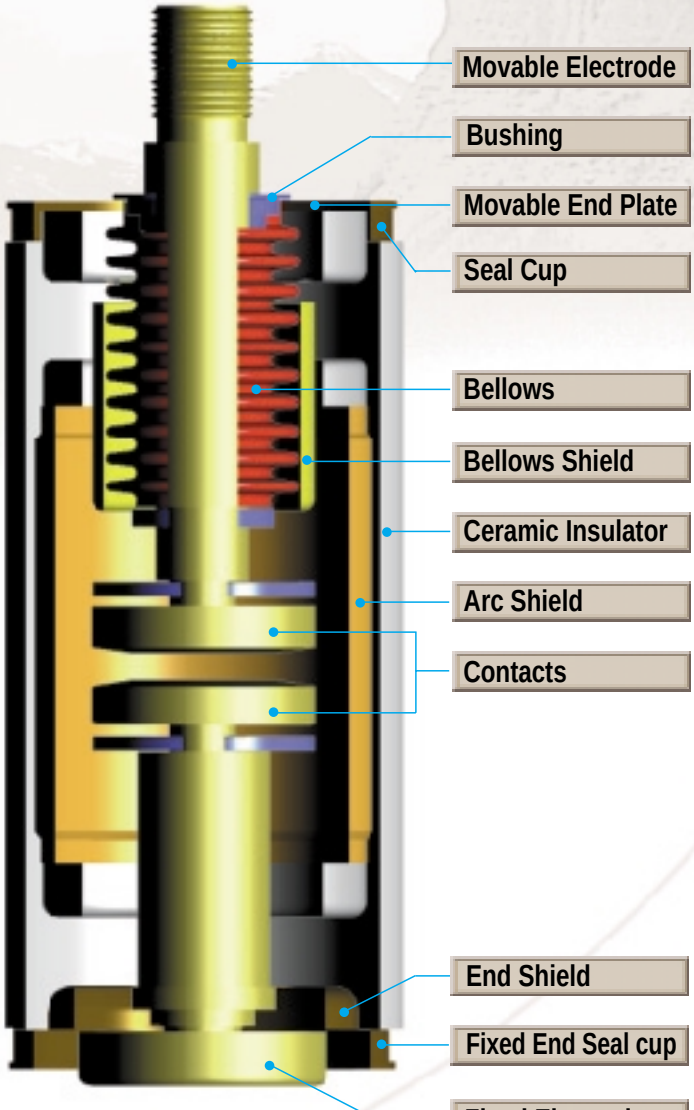

Fig1. Vacuum interrupter Schematic.

Features

- Small size and light weight.
- Hight performance, reliability and long life are assured.
- Maintains high vacuum.
- High-alumina ceramics provide superior mechanical strength and easy degassing.
- High speed interrupter can meet all IEC, ANSI and NEMA performance standards.

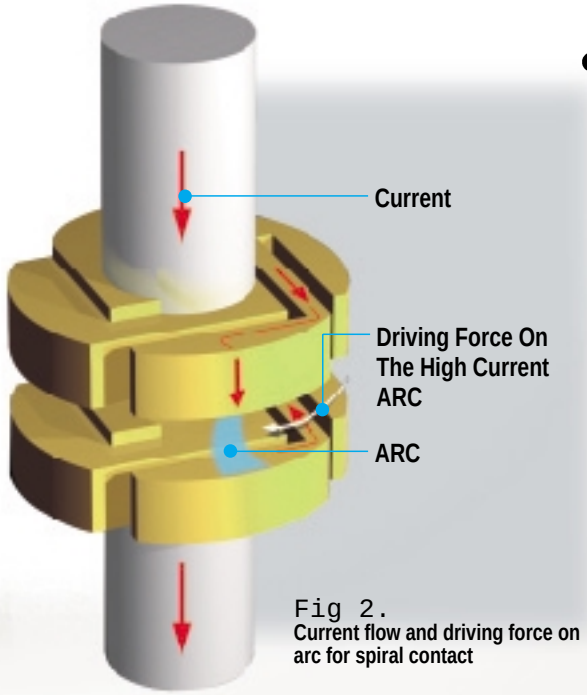

Fig 2.
Current flow and driving force on arc for spiral contact

- In the closed position, normal current flows through the interrupter. When a fault occur and interruption is required, the contacts are quickly separated. The arc drawn between the surfaces of contacts is rapidly moved around the slotted contact surface by self induced magnetic effects, preventing gross contact erosion and the formation of hot spot on the surface.
The arc burns in an ionized metal vapor, which condenses on the surrounding metal shield.
At current zero the arc is extinguished and vapor production is ceased. The metal vapor plasma is very rapidly dispersed, cooled, recombined, and deionized, and the metal vapor products are quickly condensed so that the contacts withstand the transient recovery voltage.

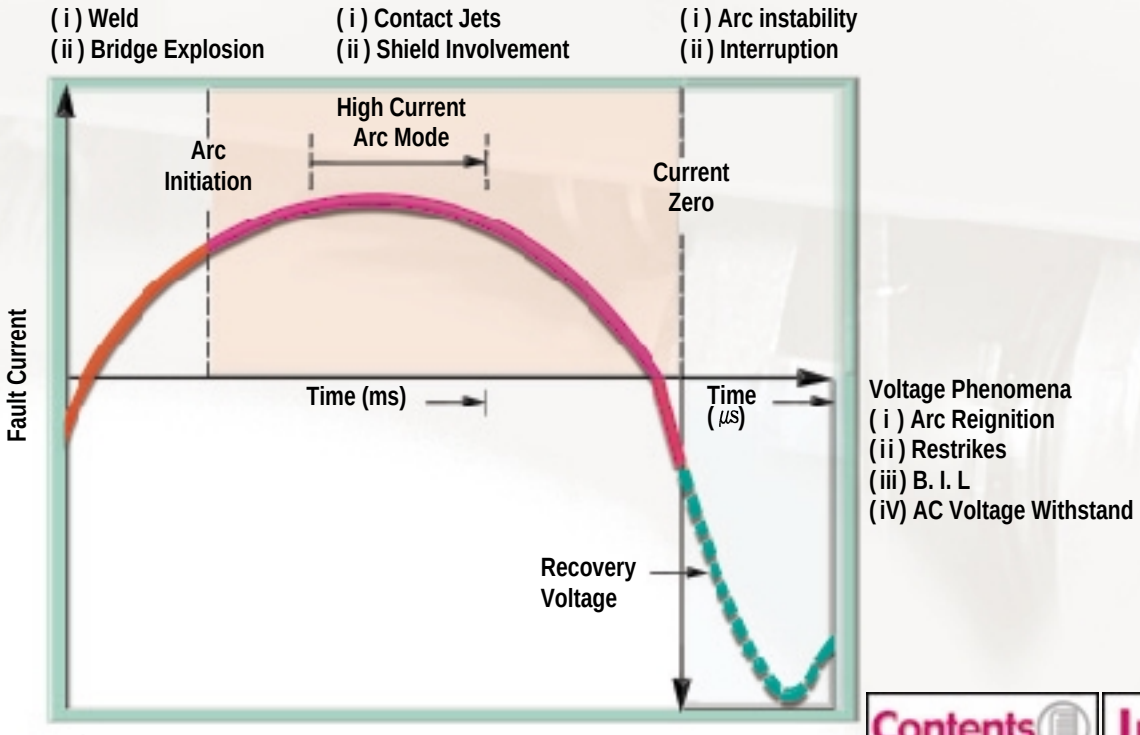

Fig3. AC arcing and interruption phenomena in vacuum.

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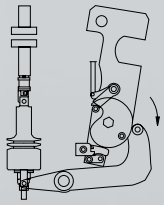
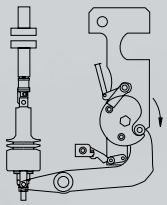
Two links operating mechanism.

1) Initial state. [Fig1]
2) Closing coil is charged by manual or motor and waiting for closing. [Fig2]
3) The CB is closed when the power is applied in the closing coil and the tripping spring is charged when closing. [Fig3]
4) After closing, closing spring is charged by motor and the tripping coil waiting for tripping. [Fig4]
5) Tripping coil trips the CB and the trip spring is discharged when tripping. [Fig5]
6) When the power is applied in the closing coil, the pre-chared coil closes the CB and the tripping coil waiting for tripping [Fig6] .
7) Tripping coil trips the CB. [Fig7]



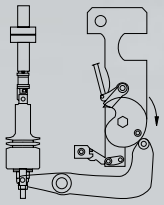
ciosing spring discharged
tripping spring discharged

Fig.1



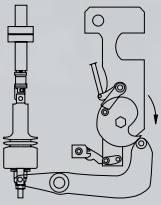
ciosing spring charged
tripping spring discharged

Fig.2



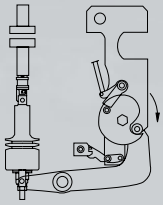
ciosing spring discharged
tripping spring charged

Fig.3



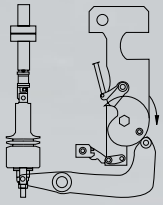
ciosing spring charged
tripping spring charged

Fig.4



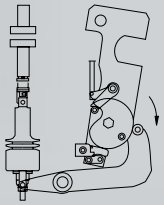
ciosing spring charged
tripping spring discharged

Fig.5



ciosing spring discharged
tripping spring charged

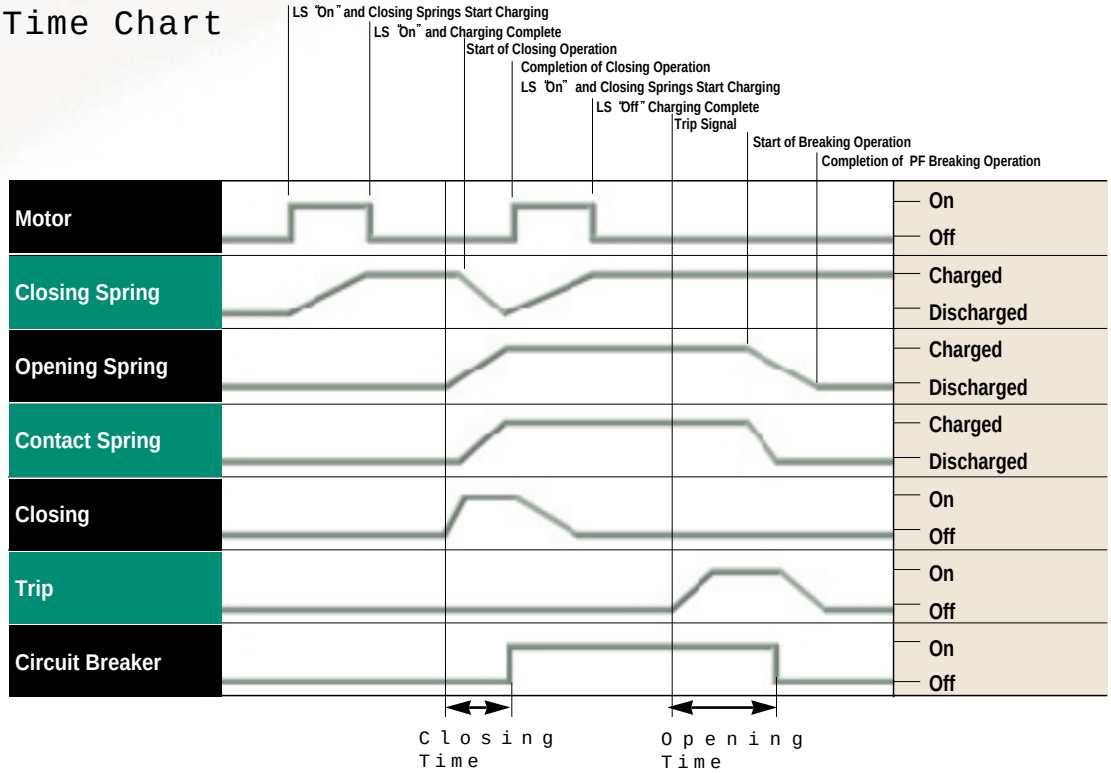
Fig.6



ciosing spring discharged
tripping spring discharged

Fig.7

Time Chart



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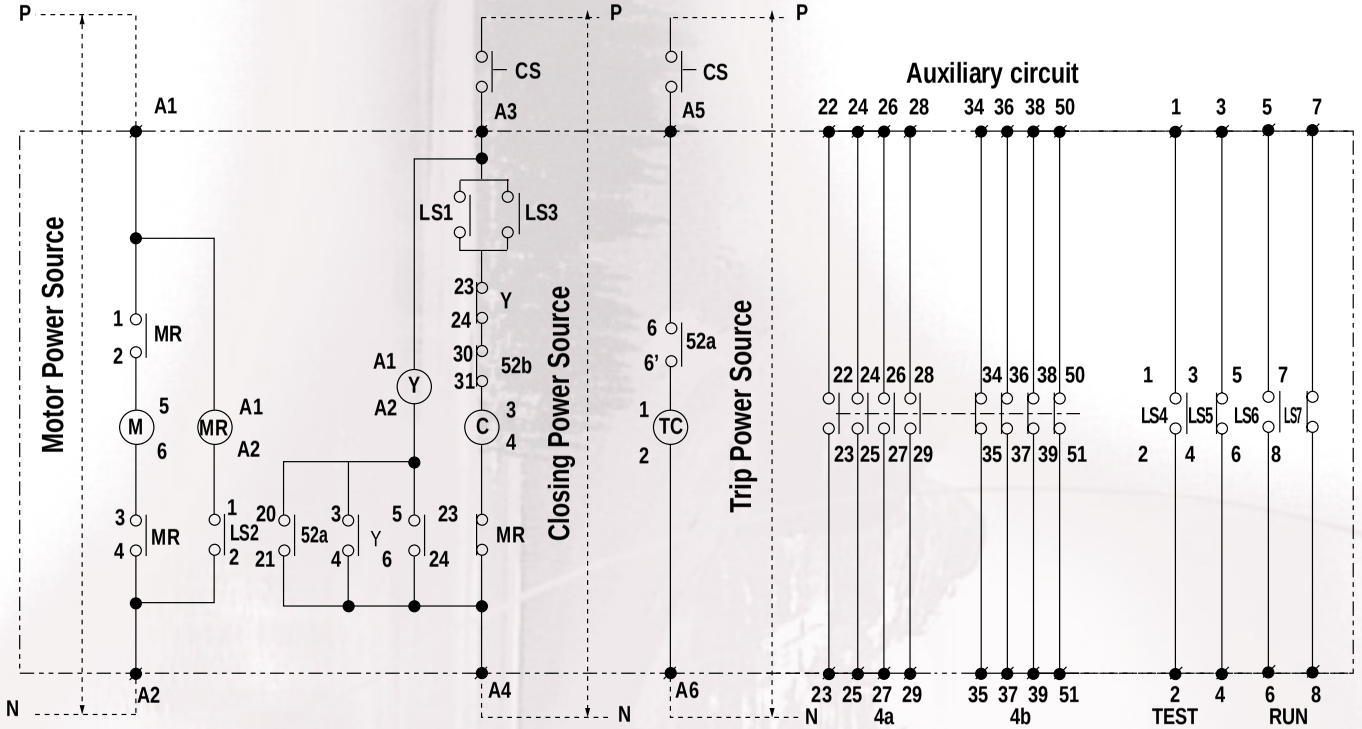
Wiring Diagram

(7.2kV 20kA~ 15kV 28kA)

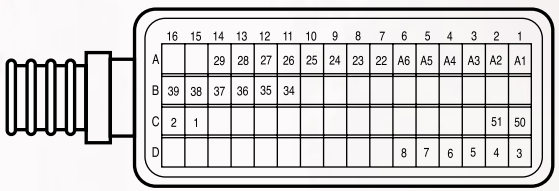


External termial of V C B

52 : Vacum circuit breaker
M : Spring charging motor
TC :Tripping coil
C : Closing coil
MR : Motor relay
Y : Anti-pump relay
52a: Aux switch (NO)
52b: Aux switch (NO)

LS2: Motor limit switch
LS1: Limit switch for preventing to close in the inserting or drawing-out condition (close at the test position)
LS3: Limit switch for preventing to close in the inserting or drawing-out condition (close at the connected position)
LS4: Position s/w(test)
LS5: Position s/w(test)
LS6: Position s/w(run)
LS7: Position s/w(run)

Secondary Disconnect Wiring



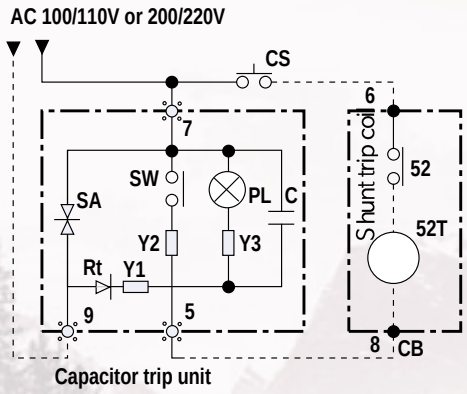
Optional Accessories

Condenser Trip Device

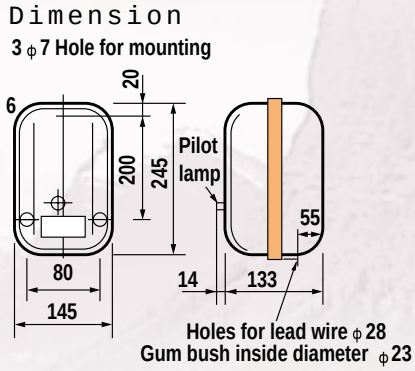
The standard power supply of the tripping circuit is DC.
If you have only AC power, the CTD converts the AC power to DC.

Type	VCB-T1	VCB-T2
Input Voltage	100 / 110V AC	200 / 220V AC
Effective time for tripping	Within 30 sec after AC power interruption	
CB Shunt trip coil	100V DC	200V DC

Connection Diagram



Dimension

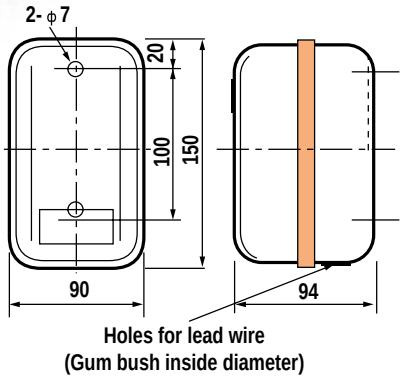


Rectifier Close Device

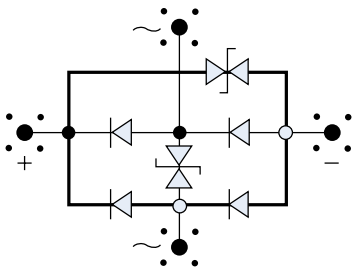
When the power supply of the closing circuit is AC,
the Rectifier Device is used.

Type	AC Input Voltage	DC Output Current	Rating Time
VCB-X	100/110V or 200/220V	40A / Shorttime ratings	10sec

Dimension



Connection Diagram

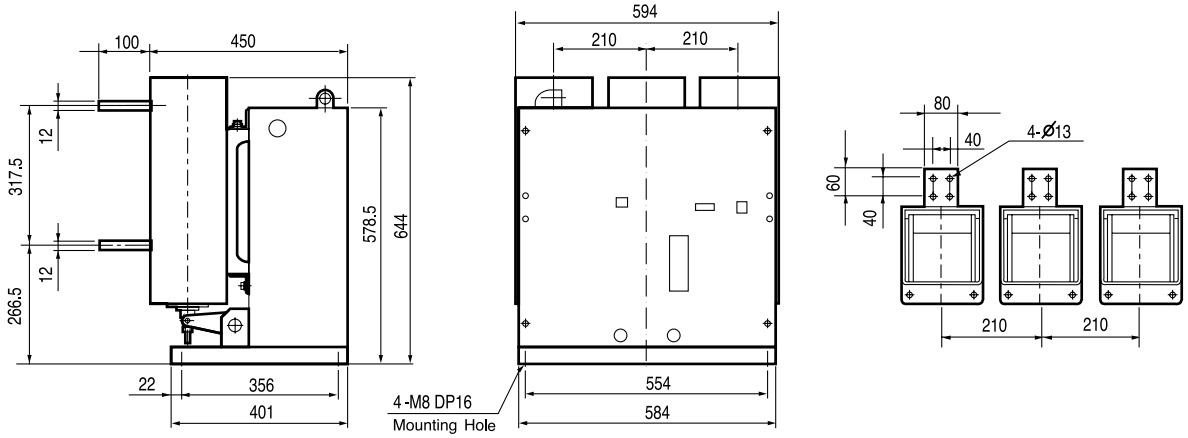


Key Lock

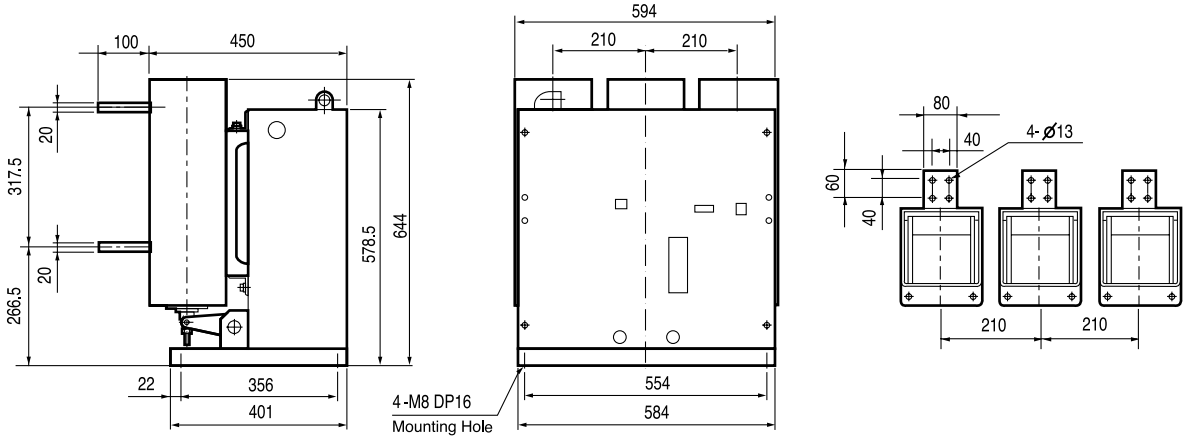
Pad Lock

External Dimensions

7.2 / 12kV	20/25kA	630A, 1250A	P1 TYPE
15kV	18kA	1250A	



7.2 / 12kV	20/25kA	2000A	P1 TYPE
	31.5kA	1250A, 2000A	
15kV	18kA	2000A	



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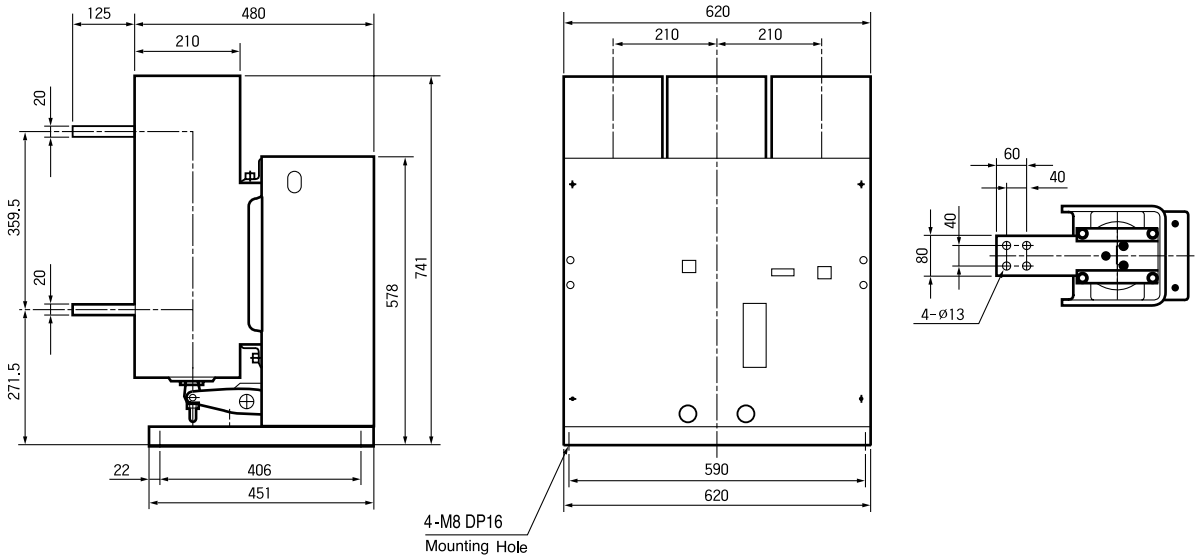
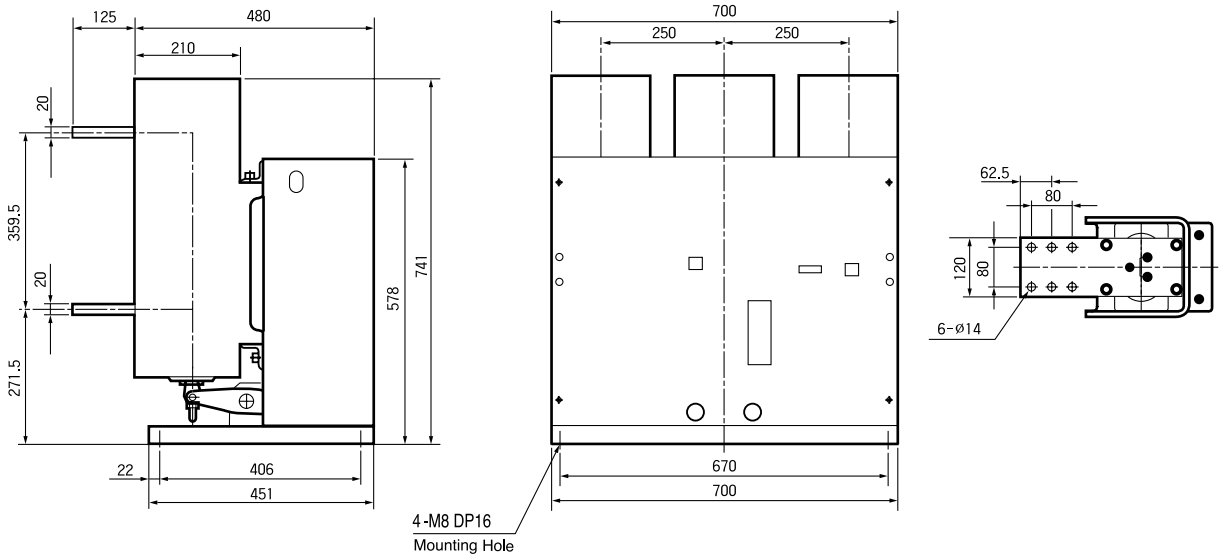
7.2 / 12kV	40kA	1250A, 2000A	P1 TYPE
15kV	28kA	1200A, 2000A	



7.2 / 12kV	31.5/40kA	3150A	P1 TYPE



External Dimensions

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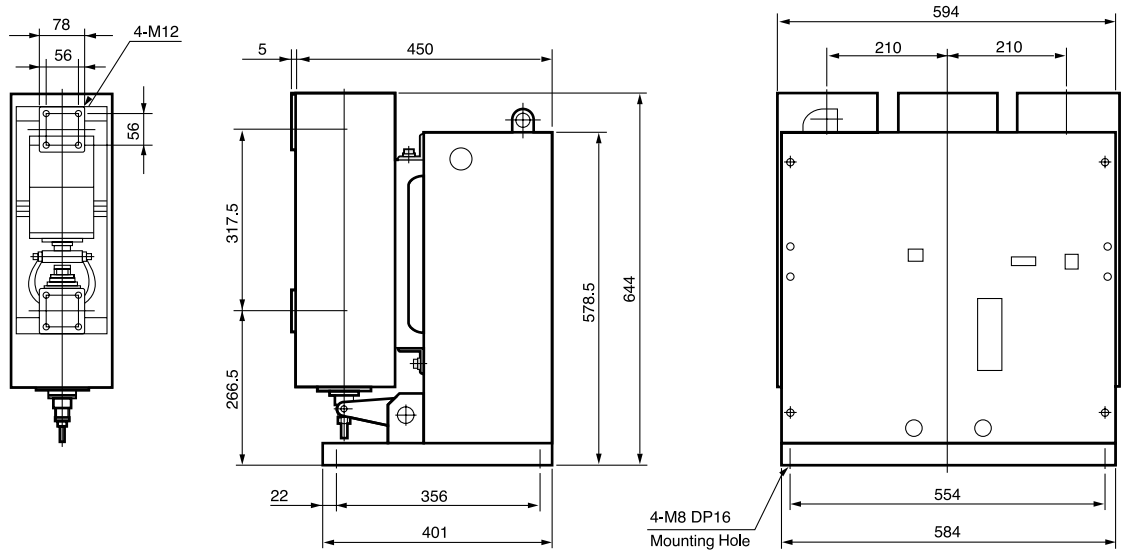
15kV	18kA	1200A	



7.2 / 12kV	20/25kA	2000A	P2 TYPE
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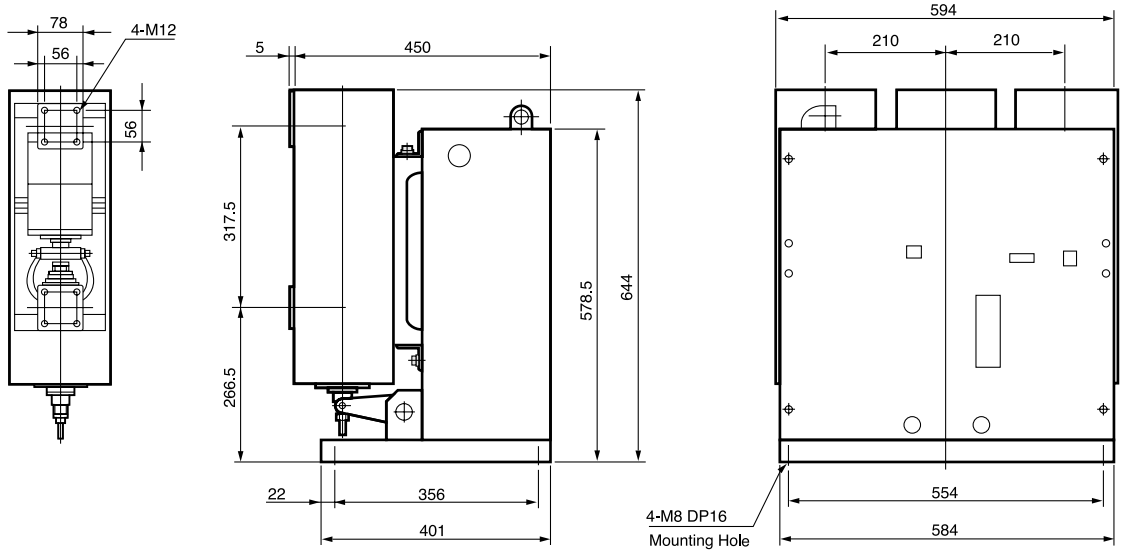
15kV	18kA	2000A	



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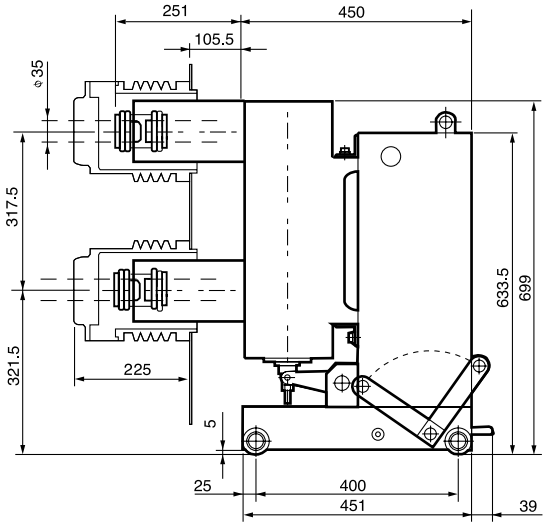
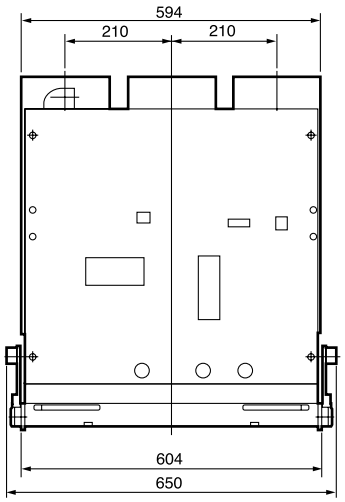
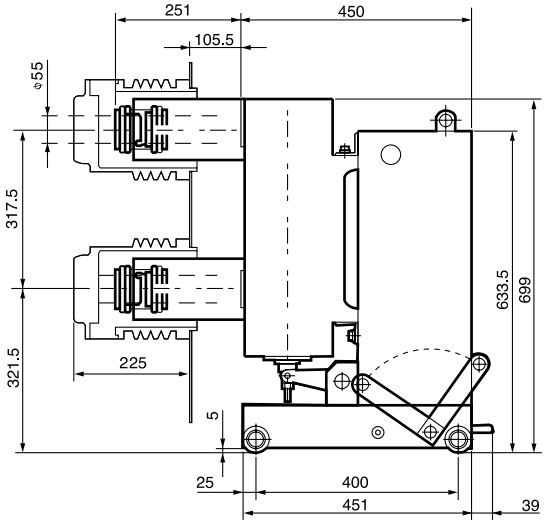
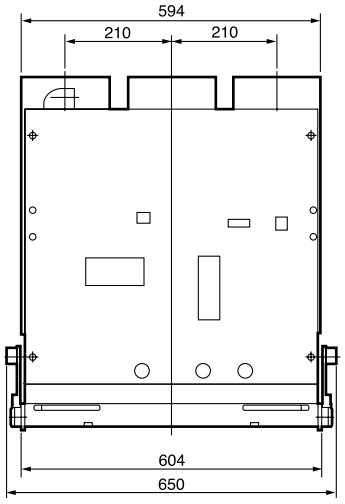
7.2 / 12kV	20/25kA	630A, 1250A	M TYPE
15kV	18kA	1200A	





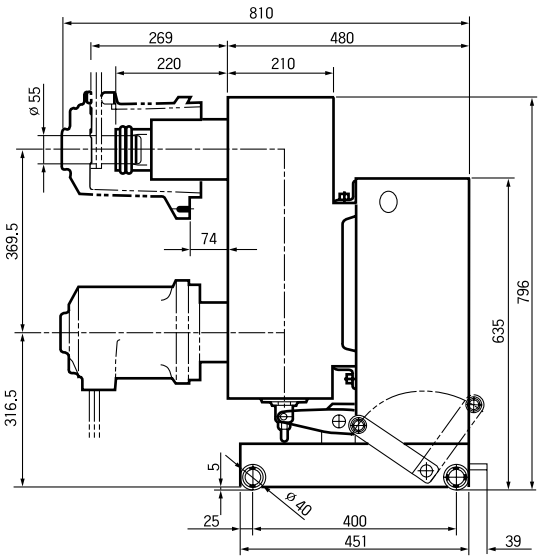
7.2 / 12kV	20/25kA	2000A	M TYPE
	31.5kA	1250A, 2000A	
15kV	18kA	2000A	

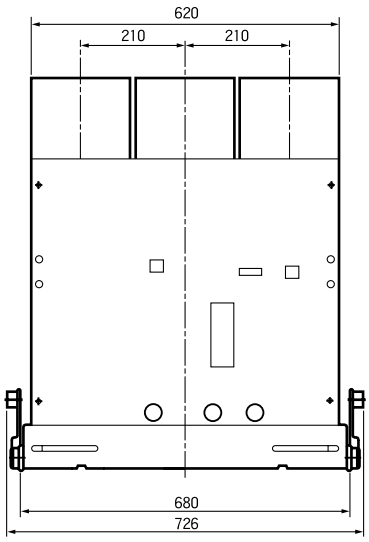




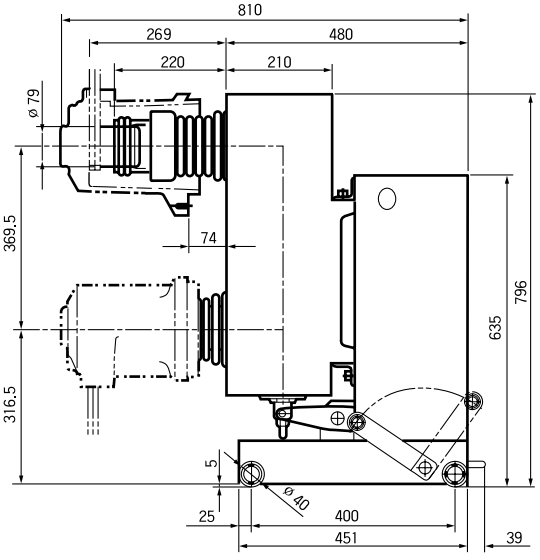
External Dimensions

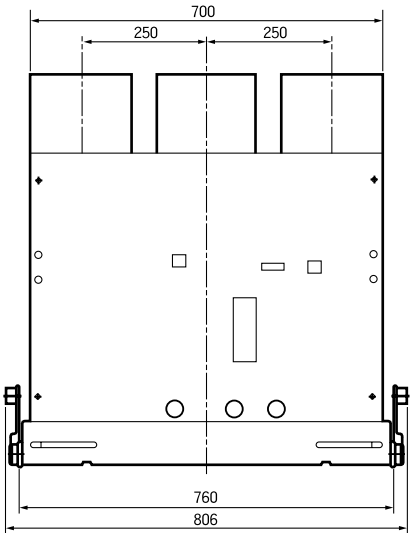
7.2 / 12kV	40kA	1250A, 2000A	M TYPE
15kV	28kA	1200A, 2000A	





7.2 / 12kV	31.5 /40kA	3150A	M TYPE





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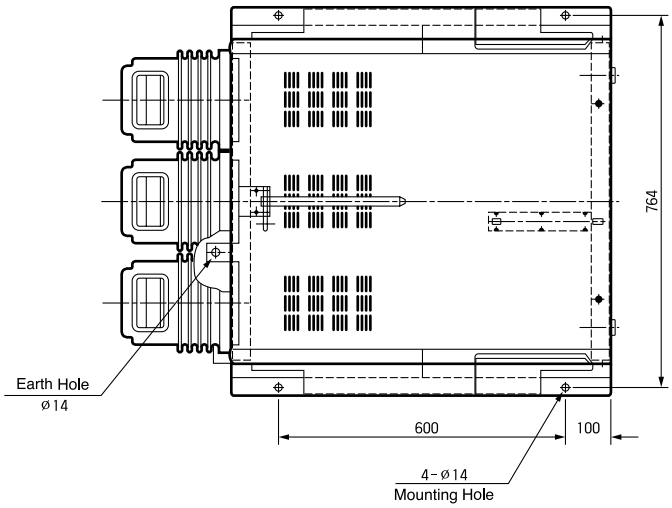
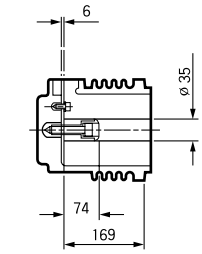
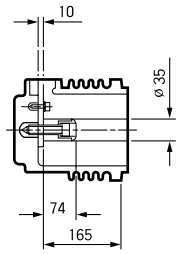
7.2 / 12kV	20 / 25kA	630 / 1250A	G TYPE(Standard)
15kV	18kA	1200A	

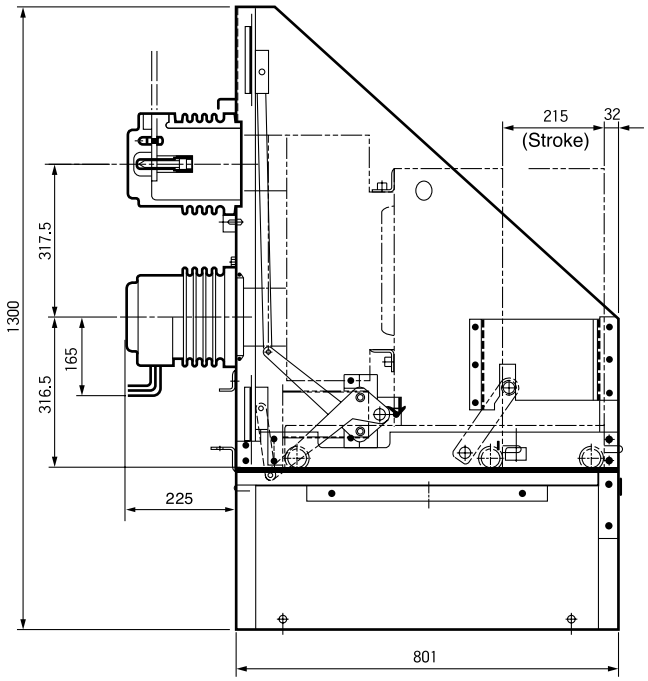


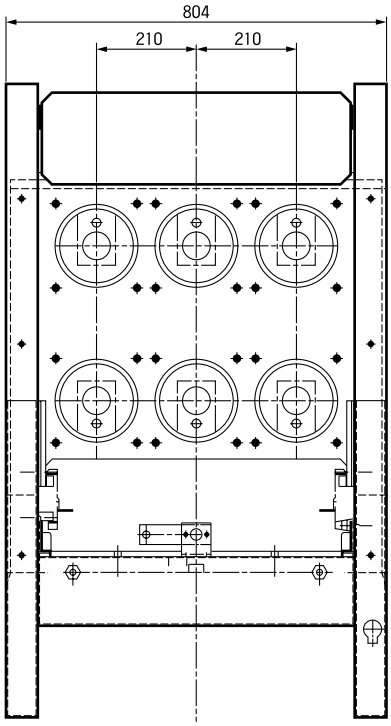


7.2/12kV 20/25kA 630A



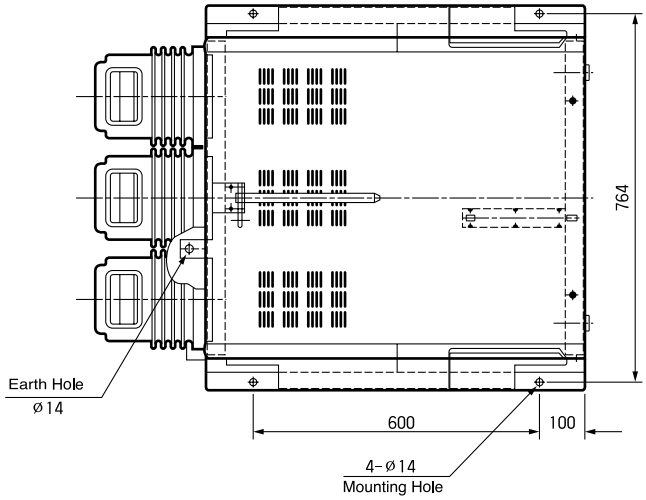
7.2/12kV 20/25kA 1200A
15kV 18kA 1200A

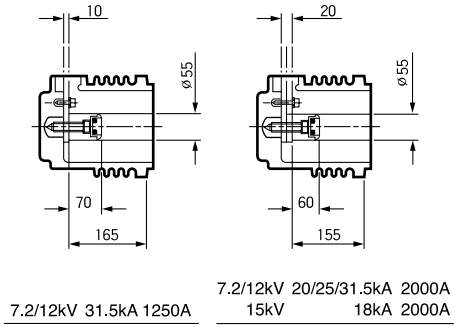


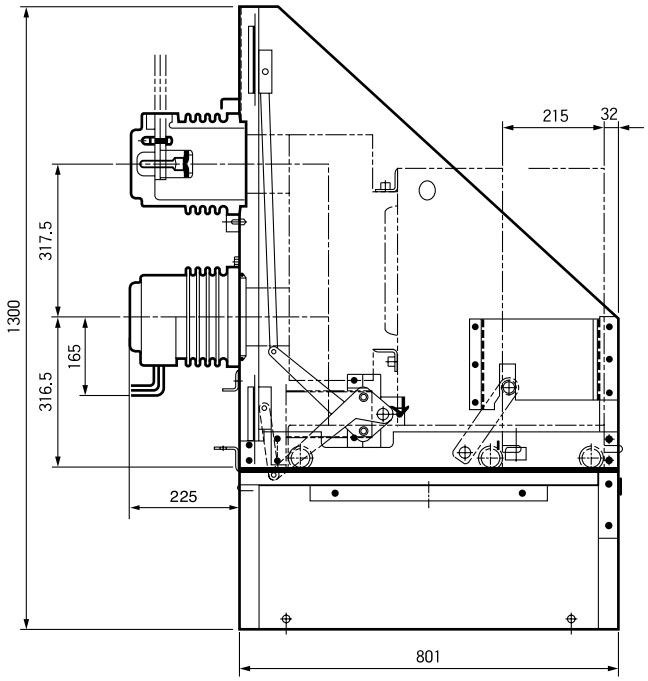


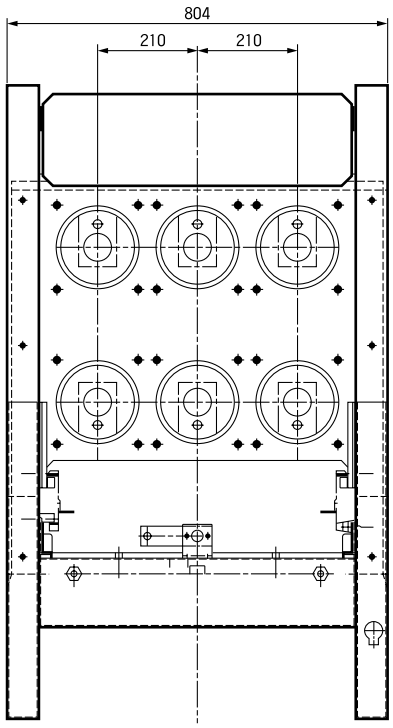
External Dimensions

7.2 / 12kV	20 / 25kA	2000A	G TYPE(Standard)
	31.5kA	1250A, 2000A	
15kV	18kA	2000A	









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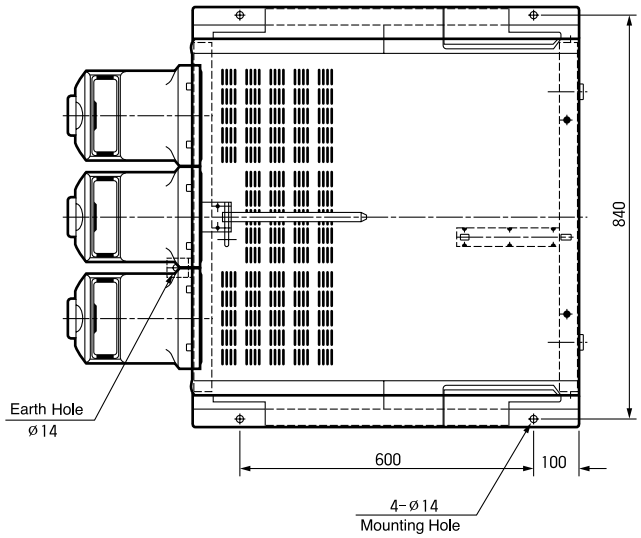
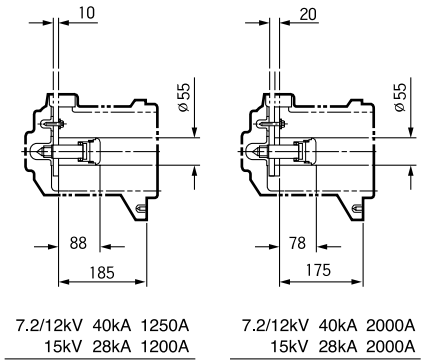
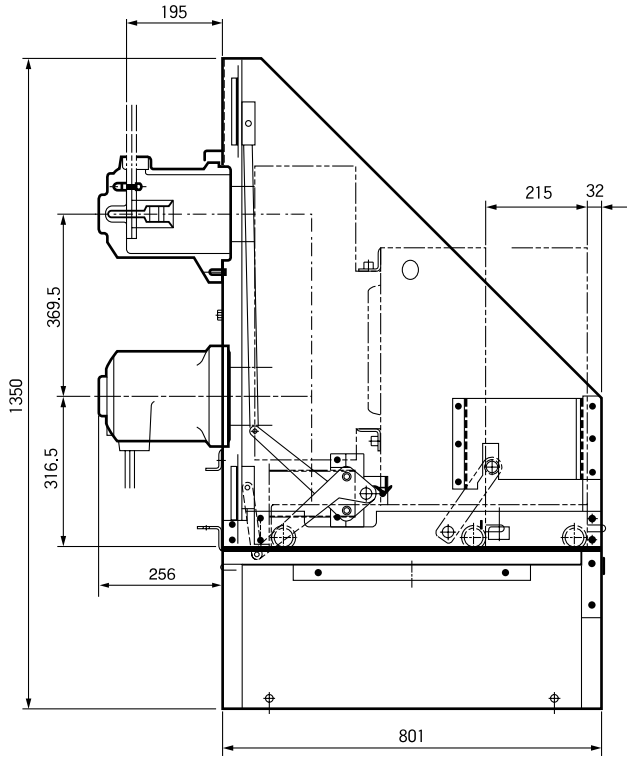
7.2 / 12kV	40kA	1250A / 2000A	G TYPE(Standard)
15kV	28kA	1200A / 2000A	

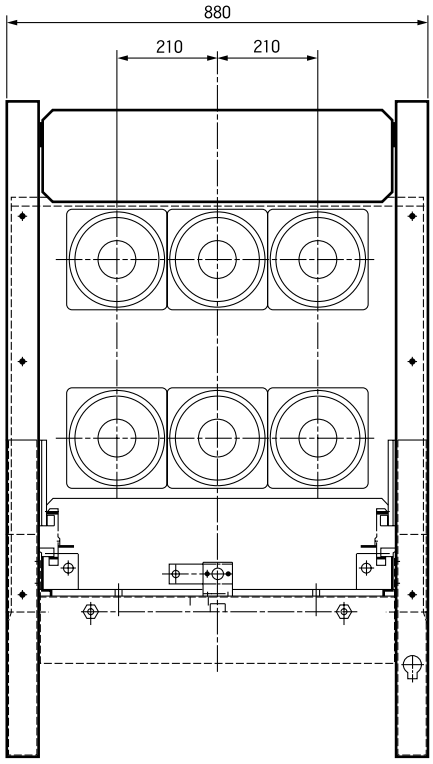




7.2/12kV 40kA 1250A
15kV 28kA 1200A

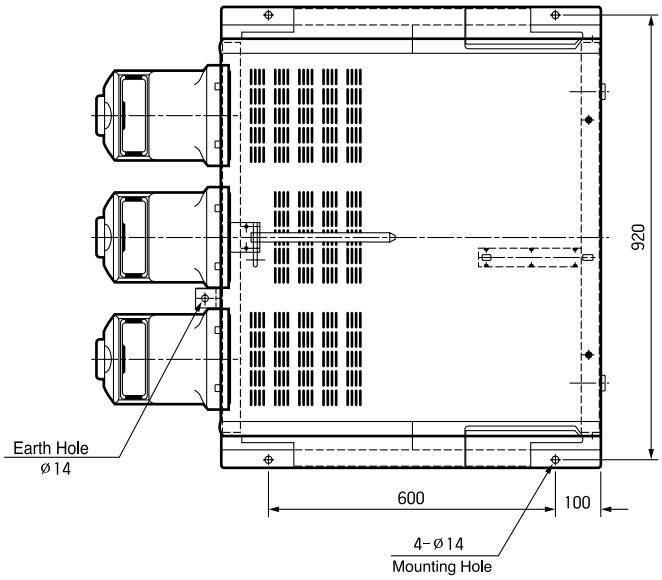
7.2/12kV 40kA 2000A
15kV 28kA 2000A

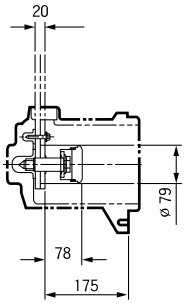




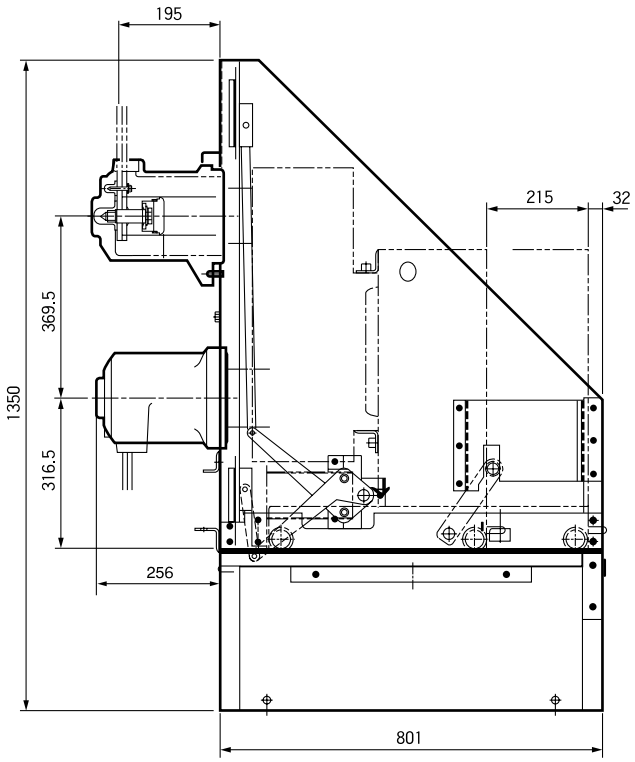
External Dimensions

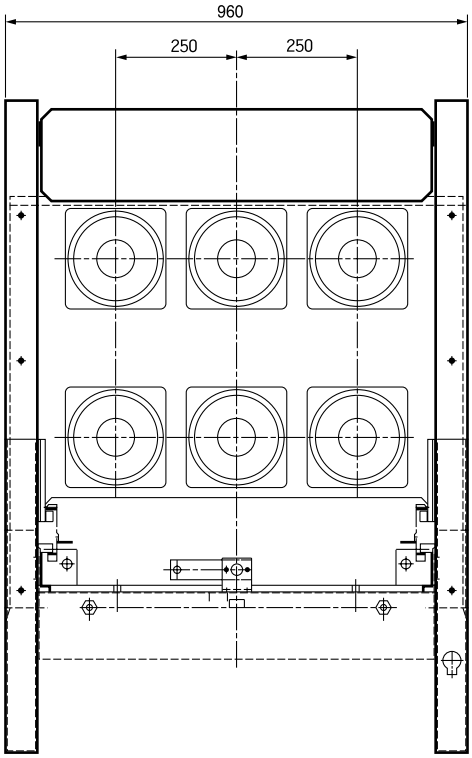
7.2 / 12kV	31.5 /40kA	3150A	G TYPE(Standard)





7.2/12kV 31.5/40kA 3150A





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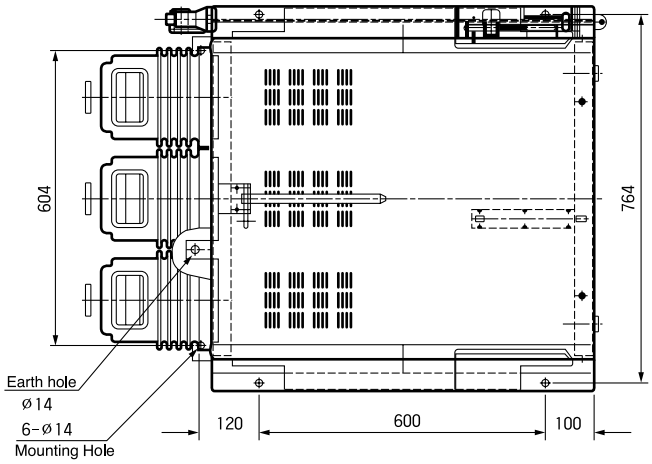
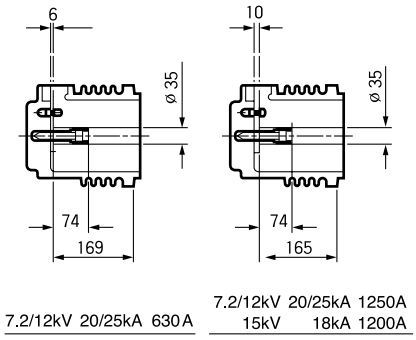
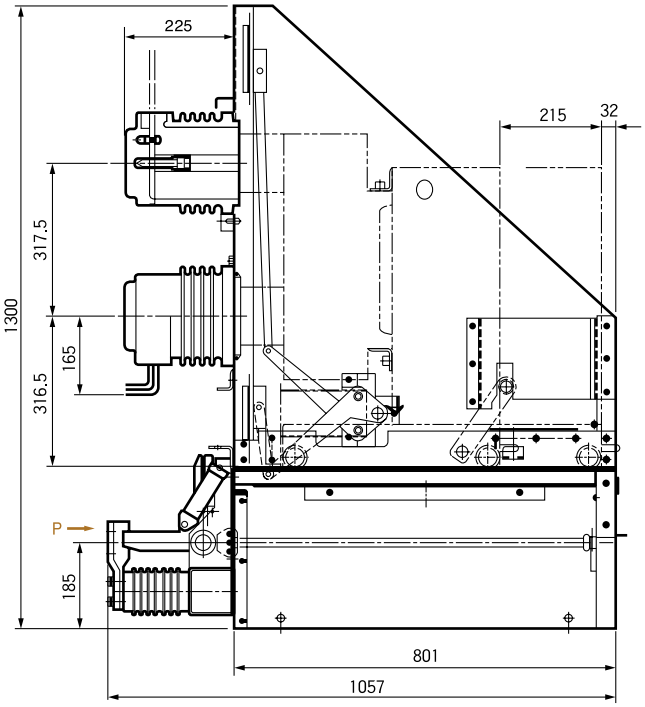
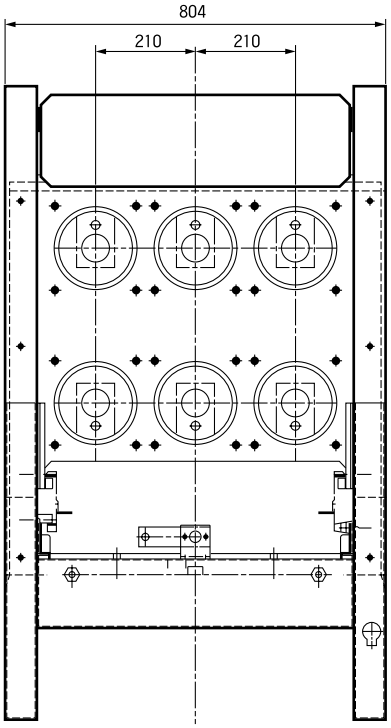
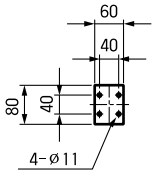
7.2 / 12kV	20/25kA	630A, 1250A	G TYPE (With Earthing s/w)
15kV	18kA	1200A	







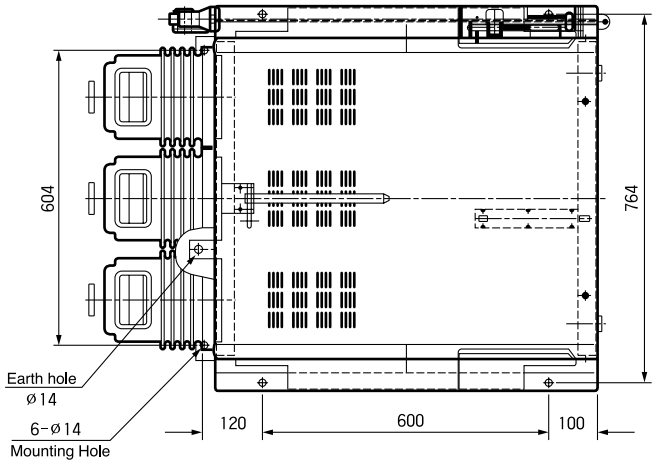


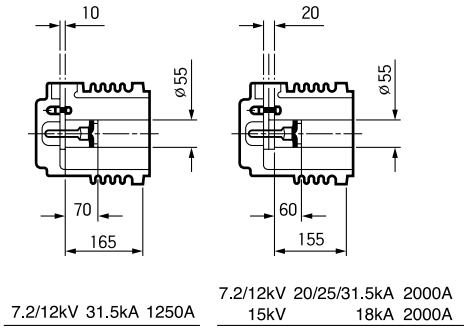


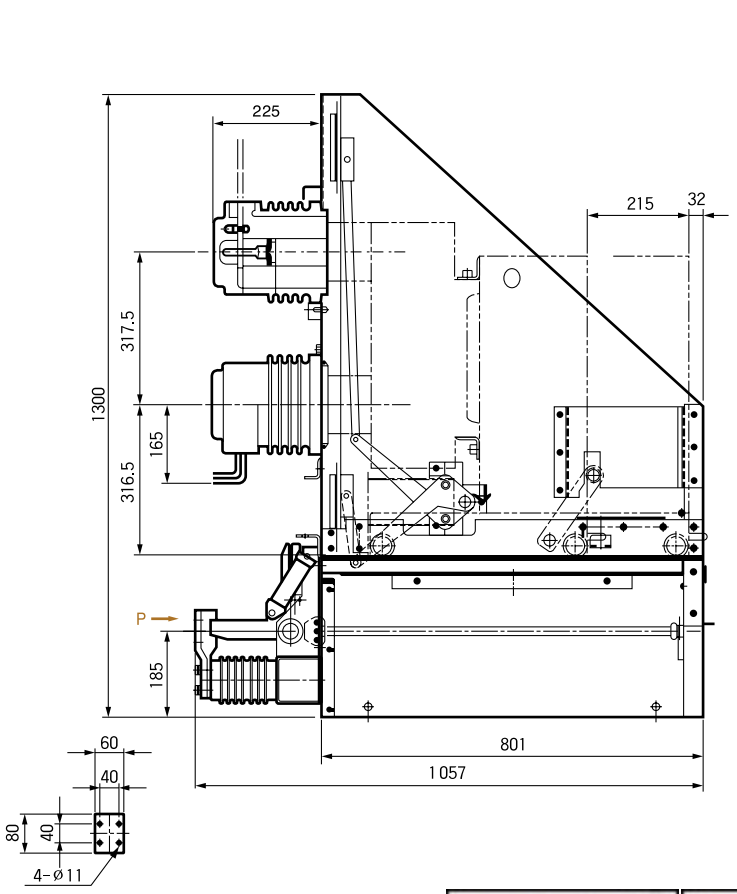
View P

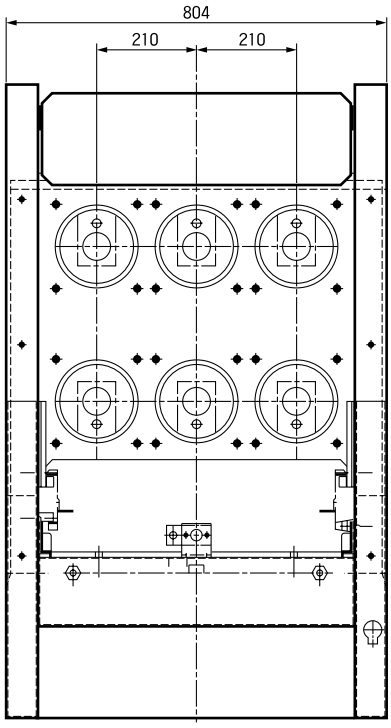
External Dimensions

7.2 / 12kV	20 / 25kA	2000A	G TYPE (With Earthing s / w)
	31.5kA	1250, 2000A	
15kV	18kA	2000A	









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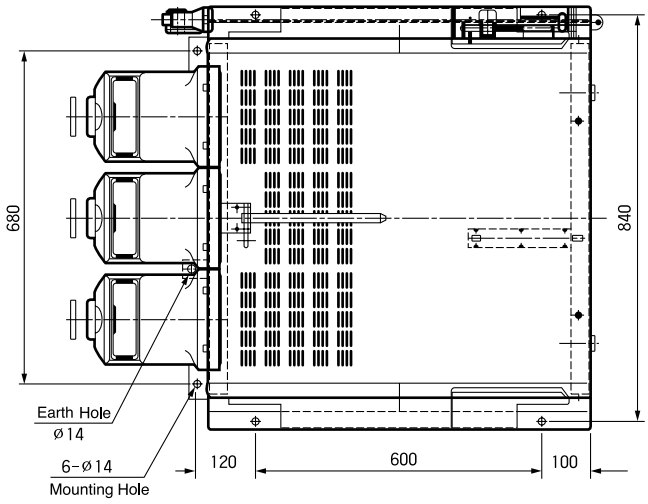
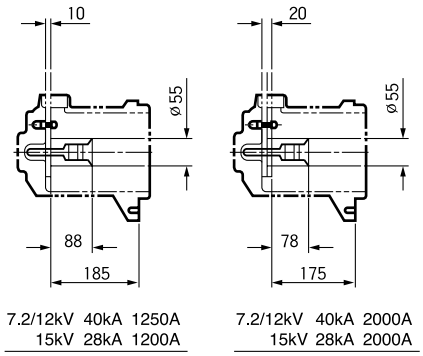
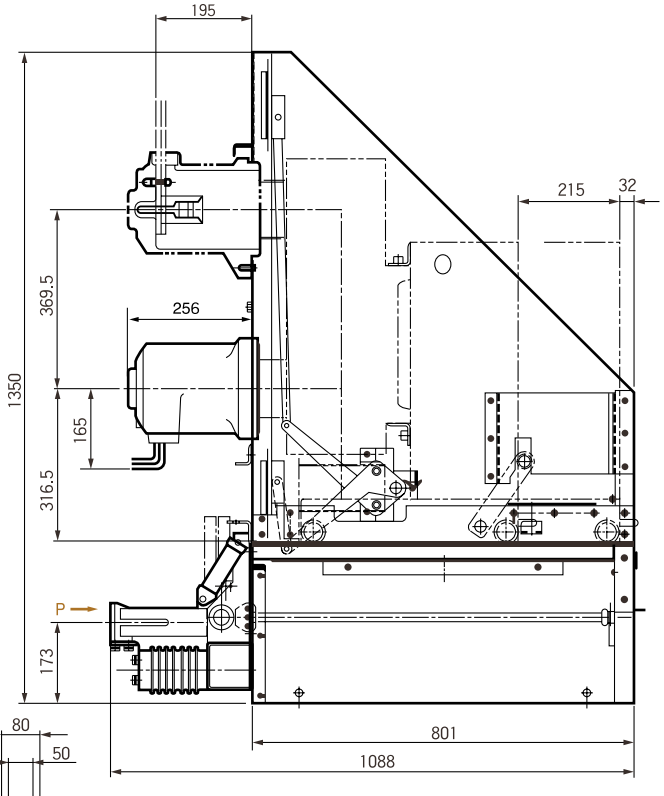
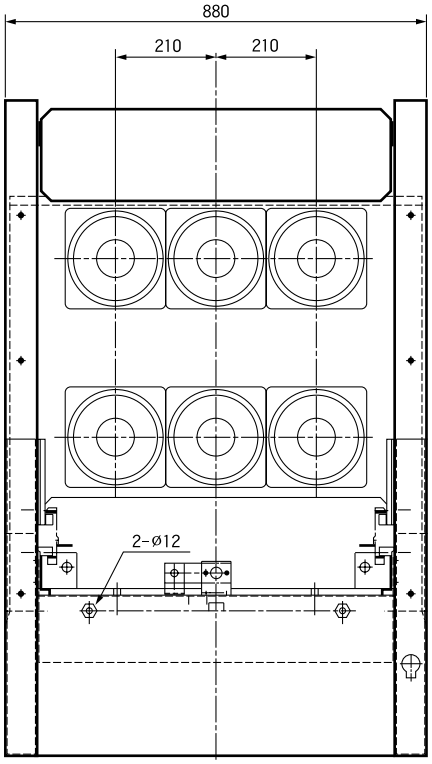
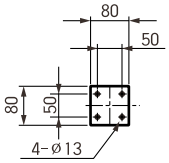
7.2 / 12kV	40kA	1250A, 2000A	G TYPE (With Earthing s / w)
15kV	28kA	1200A, 2000A	











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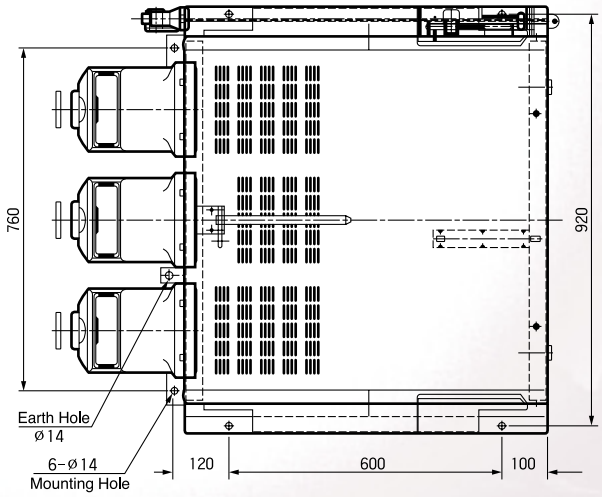
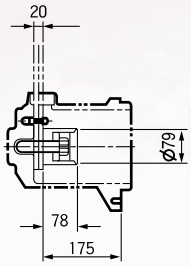
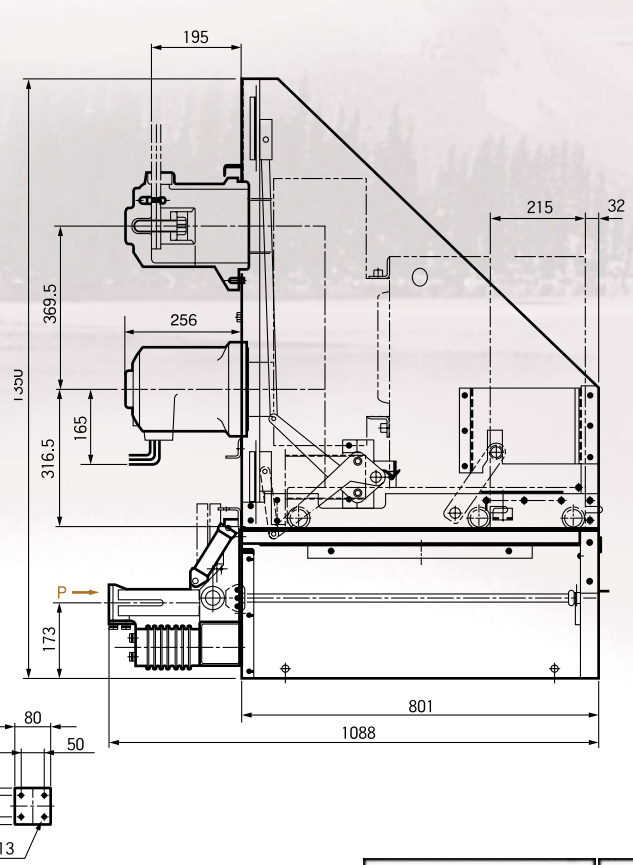
External Dimensions

7.2 / 12kV	31.5 / 40kA	3150A	G TYPE (With Earthing s / w)







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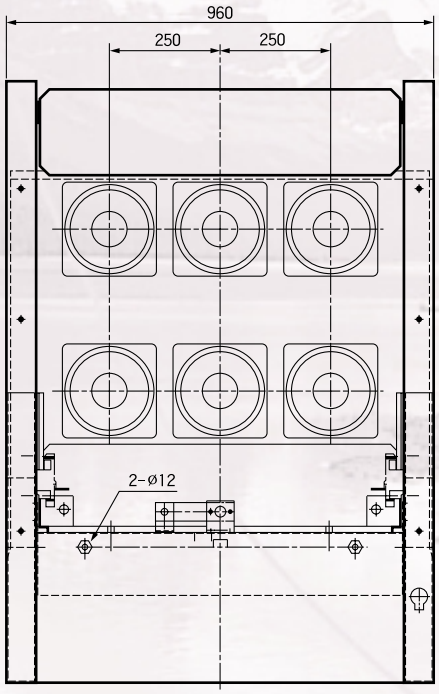

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Ordering Information

LG VCB

Installation Type
P1 : Fixed type (Horizontal bus bar)
P2 : Fixed type (Vertical bus bar)
M : Draw-out type without cradle
G : Draw-out type with G class cradle

Rated Current
600 : 600 / 630A
1200 : 1200 / 1250A
2000 : 2000A
3000 : 3000 / 3150A

Interrupting Capacity

7.2kV
250 : 250MVA(20kA)
300 : 300MVA(25kA)
350 : 350MVA(31.5kA)
500 : 500MVA(40kA)

10/12kV
400 : 350/415MVA(20kA)
500 : 430/520MVA(25kA)
650 : 545/655MVA(31.5kA)
800 : 700/830MVA(40kA)

15kV
500 : 460MVA(18kA)
750 : 720MVA(28kA)

Rated Voltage
06 : 7.2(6.6)kV
12 : 12(10)kV
15 : 15(13.8)kV

Motor Control Voltage
M1 : DC 110V
M2 : DC 220V
M3 : DC 125V
M4 : DC 48V

Closing / Trip Control Voltage
F1 : DC 110V
F2 : DC 220V
F3 : DC 125V
F4 : DC 48V

HiMEC Series

Accessories
- : Aux. contacts (4a + 4b)
A1 : Aux. contacts : (5a + 5b)
A2 : Aux. contacts : (7a + 7b)
A3 : Aux. contacts : (10a + 10b)
T : Condenser trip device
X : Rectifier close device
KL : Key lock
PL : Pad lock

* For 5, 24, 25.8kV contact the manufacturer.

Ordering Sheet

Circuit breaker

Rating	Voltage (kV), Current (A), Frequency (Hz), Interrupting current (kA)
Mounting Type	☐ P1 (Fixed type with horizontal bus bar) ☐ P2 (Fixed type with vertical bus bar) ☐ M (Draw-out type without cradle) ☐ G (Draw-out type with G class cradle) *Earth s/w : ☐ Needed
Rating of motor charging	☐ DC 110V ☐ DC 220V ☐ DC 125V ☐ DC 48V
Rating of Closing & Trip control voltage	☐ DC 110V ☐ DC 220V ☐ DC 125V ☐ DC 48V

Operation & accessories

Auxiliary s/w (AX)	☐ 4a4b (standard)	☐ 5a4b	☐ 5a5b
	☐ 7a7b	☐ 10a10b(max.)	☐ Other ( )
Condensor trip device	☐ Not needed	☐ T1	☐ T2
Rectifier close device	☐ Not needed	☐ Needed	
Key lock	☐ Not needed	☐ Needed	
Pad lock	☐ Not needed	☐ Needed	

*When ordering, please include this sheet.

Overseas Network

1 Bangkok 2 Hanoi 3 Jakarta 4 Kuala Lumpur 5 Manila
6 Tokyo 7 Bogota 8 New Jersey 9 Pennsylvania 10 Sao Paulo
11 Beijing 12 Dalian 13 Shanghai

LG constantly endeavors to improve our products, so that information in this catalog is subject to change without notice.

LG Industrial Systems Co., Ltd.

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